32. The modular construction system of claim 29, further comprising a second joinery assembly that includes at least one bracket attached to the struts of at least two panels, the at least one bracket having an opening extending therethrough, and a tubular element that extends through the opening in the at least one bracket for connecting a plurality of panels together.

33. The modular construction system of claim 32, wherein the second joinery assembly further includes joint closures for covering the space between the struts and bracing elements for securing the panels in place.

REMARKS

The specification has been amended to correct certain informalities noted by the Examiner and Applicant to more clearly define the subject matter of the invention. The specification is now believed to be in acceptable form.

The abstract has been amended to reduce the number of words to less than 150 and to more clearly and sufficiently describe the disclosure of the invention. The abstract is now believed to be in acceptable form.

Claims 1-18 are pending in the application. This amendment cancels claims 1-18 and adds new claims 19-33. In view of the cancellation of claims 1-18, the Examiner's objections to the claims and rejections under 35 U.S.C. § 112, second paragraph are considered moot and will not be discussed in this amendment. The Applicant believes that newly added claims 19-26 are in proper form.

With regard to the claim rejections under 35 U.S.C. § 102(b) as being anticipated by Fay, U.S. Patent 2,057,942, and the claim rejections under 35 U.S.C. § 103(a) as being unpatentable

over Fay because of obviousness, the Applicant believes new claims 19-26 are distinguishable from the Fay reference.

Fay discloses a toy construction system comprising a plurality of construction units, each provided with straight edges having projecting knuckles, being adapted to be positioned edge to edge with the knuckles from another construction unit in aligned relation so as to receive a pin whereby the units are connected together. The units are in the form of flat plates with straight edges, the edges being of like dimensions so that the plates may be matched edge to edge with their knuckles in intervening or matched relation.

The present invention differs from the invention of Fay, in that the present invention is not a toy construction system, but an architectural scale construction system for constructing life-size buildings for human habitation, requiring panels of substantial thickness. Another difference between the present invention and the Fay reference is that the Fay reference only includes a limited number of two-dimensional shapes that serve as construction units or plates, employing only a limited number of symmetrical squares, rectangles and triangles. With these shapes, only up to 10 polygons can be formed, versus at least 108 polygons with the present invention. Thus, there is a limitation in the shape of plates that can be connected together at any given scale. In contrast, the present invention includes an inventory of at least 59 different panel shapes, often asymmetrical and of varying proportions. The connection mechanisms of the present invention allow for panel shapes of this inventory to be connected to each other in limitless combinations for creating a diversity of building forms.

Another major difference between the Fay reference and the present invention is the structure and method of connecting the plates or panels together. In the Fay reference, each side

or edge of a plate includes a specific number of integral hollow cylindrical knuckles extending from the body of the plate to mate with like integral knuckles from another plate. Two sides of a plate are mated together with their knuckles in intervening or matched relation and a pin is placed through openings in the hollow cylindrical knuckles to connect one side of a plate or plates to one side of another plate or plates. After connection, the sides of the plates are essentially edge to edge, spaced apart only by the diameter of the knuckles, which when filled with a solid pin, allow no space for other installations. The connection mechanisms of the present invention are very different from the hinge mechanism disclosed and taught in the Fay reference. Specifically, in the present invention, the struts that form the perimeter of the panels are offset by the connection mechanisms to create space between the sides of adjoining panels and at the vertices of adjoining panels providing a continuous chase for architectural service requirements.

Another major difference between the Fay reference and the present invention is the options for connecting plates or panels together. In the Fay reference, the knuckles of the pin-hinge system allow for only two plates or panels to be joined about any given axis. In the present invention, more than two plates or panels can be joined about any given axis. In the Fay reference, the axis about which two plates are joined is offset with respect to the plane of the plate or panel. In the present invention, the axis between two or more plates or panels being joined is centered exactly at the center of the plate edges or panel sides. In the Fay reference, the connection of each additional plate or panel requires an additional axis and a doubling up of plates or panels, making it impractical for architectural applications.

The Applicant has presented new claims 19-33 that remove the indefiniteness from the original claims and include elements to distinguish them from the prior art. Nothing in the Fay reference or any other cited prior art reference teach or suggest such an inventory of panel shapes being connected together as in the present invention on an architectural scale for building structures of different and unique shapes and sizes.

In view of the amendments and remarks presented above, the Applicant believes that the application is now in condition for allowance, and requests reconsideration of the application and allowance of the claims. The Applicant respectfully requests that the Examiner telephone the undersigned in the event a telephone conference would expedite prosecution of the application.

Respectfully submitted,

GODFREY & KAHN, S.C.

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By: William K. Baxter
William K. Baxter
Reg. No. 41,606

Attorneys of Record for Applicant
GODFREY & KAHN, S.C.
780 North Water Street
Milwaukee, WI 53202-3590
Telephone: 414-273-3500
Facsimile: 414-273-5198
Email: wbaxter@gklaw.com

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

In accordance with 37 C.F.R. § 1.121(b)(1)(iii), the following is a marked-up version of the replacement paragraphs of the specification.

The paragraph beginning at page 25, line 20 has been amended as follows:

FIG. 13 shows an exploded view of the basic elements of the first joinery assembly which shows, in addition to the panel 60, strut 66 and centerline element 68 of FIG. 12, a "bridge" element - a horizontal planer member, parallel to the panel 60 and strut 66, called a "web" 70, and an independent tubular ring, or barrel loop, with tab extensions called a "collar" ~~50~~ 74.

The paragraph beginning at page 27, line 11 has been amended as follows:

FIG. 19 illustrates in greater detail the function of the first joinery assembly, critical to the application of the invention, which is the formation of a structural hub 78 that surrounds vertice 18, common to strut-panel assemblies being joined, as opposed to and replacing the physical node connector 64, centered on a given vertice 18. This feature provides for the joining of strut-panel corners in the multitude of combinations and directions, as prescribed in FIG. 9, with the versatility required to achieve architectural constructions of the complexity illustrated in the studies of FIG. 7A - 7E. ~~This~~ FIG. 19 shows hub 78 as a structural assemblage that consists of the first joinery assembly elements at the corners of five panels, anchored to each other as described in FIG. 14, about a common vertice. In addition to providing anchorage for strut-panel corners, the elimination of a physical node obstruction allows for continuity of the utility chase

feature throughout the joints of Fractionalized Cube panel assemblages. In this view, panels 60 are omitted.--

In the Abstract:

In accordance with 37 C.F.R. § 1.121(c)(1)(iii), the following is a marked-up version of the replacement abstract.

The abstract has been rewritten as follows:

This invention pertains to a panelized modular construction system which employs a variety of square, rectangular and triangular panel shapes related to each other, and derived from a common subdivided cube grid. Combining theses panel shapes for architectural applications requires joinery in many different combinations and angles, and in unlimited combinations of angles at the corners. Located in spaces between the sides of panels being joined, are simple connecting elements, capable of joining panels to each other in a manner that easily accommodates varying numbers of panels at any dihedral angle through almost 360 degrees. At the corners, the same versatility is achieved through a plurality of connecting elements, which allow panel corners to be joined in a manner that creates a structural hub, replacing the node connector typically positioned at this location in prior art construction systems.

In the Claims:

In accordance with 37 C.F.R. § 1.121(c)(1)(ii), the following is a marked-up version of the amended claims.

Claims 1-18 have been canceled.

Claims 19-33 have been added as follows:

19. A modular construction system comprising:

an inventory of panel shapes that are directly related to each other by virtue of their derivation from a common format, the format being a three-dimensional grid defined by twenty-seven subcubes within a single larger cube, the subcubes having corners that form sixty-four vertices occurring within the grid, from each of which, straight line radians are drawn to each of the other sixty-three vertices, upon repeating for all sixty-four vertices, revealing fifty-nine panel shapes that are defined within the grid format, the panel shapes forming panels having a plurality of sides;

wherein single line radians between any two vertices are axes between the vertices as applied to construction assemblies, being aligned with panel centerlines that are parallel and equidistant to the sides of the panels of the inventory of panel shapes being joined;

a means of constructing a structure from the inventory of panel shapes on an architectural scale that allows for a plurality of panels to be connected at a plurality of angles, with respect to each other, about a given axis parallel to the panel sides about which at least two panels are joined, or about a given vertice, where the axes between the sides of the panels being joined intersect, the plurality of panels including structural, load bearing struts attached along the panel sides which can converge on the given vertice and in any direction; and

wherein the strut provides a panel shape framework forming the perimeter of the panel to carry the weight of the panel and allow connection to other panels.

20. The modular construction system of claim 19, wherein the struts are offset from, parallel to, and rotational about any given axis between vertices, providing for a plurality of

struts that may occur along any given axis between vertices, and positioned in a plurality of angles, with respect to each other.

21. The modular construction system of claim 19, further comprising at least two connection mechanisms for joining a plurality of panels together, the connection mechanisms providing space along and parallel to an axis between the sides of the panels being joined for the installation of wiring, plumbing or other utility lines.

22. The modular construction system of claim 21, wherein the connection mechanisms include tubular elements that are centered exactly on the axis between any two given vertices and are linked to the struts of at least two panels.

23. The modular construction system of claim 22, wherein the tubular elements are linked to the struts by webs that are extensions along the strut panel corners and brackets that are extensions along the strut panel sides.

24. The modular construction system of claim 23, wherein the webs and brackets create a space between the strut panel sides and the tubular elements connecting a plurality of panels together.

25. The modular construction system of claim 19, wherein the struts are offset from the axis between the two vertices and are joined to a common tubular element by means of webs and brackets that are attached to the struts for joining at least two panels together.

26. The modular construction system of claim 19, wherein the plurality of panel shapes are joined together by at least two joining mechanisms for simple attachment of the panel shapes for building a structure.

27. A modular construction system comprising:

an inventory of panel shapes derived from a three-dimensional grid defined by twenty-seven subcubes within a single larger cube, the panel shapes forming a plurality of panels having a plurality of sides thereto; and

a means for connecting a plurality of panels together at any angle through 360 degrees about any axis between vertices and at any dihedral angle with respect to each other for building architectural structures.

28. The modular construction system of claim 27, wherein the plurality of panels include struts attached along the sides of each of the panels forming the perimeter of the panels and panel shape framework to carry the weight of the panels and allow connection to other panels.

29. The modular construction system of claim 28, wherein the means for connecting the plurality of panels together includes at least one joinery assembly.

30. The modular construction system of claim 29, further comprising a first joinery assembly that includes at least one web attached to the struts of at least two panels, at least one collar having an opening extending therethrough and at least one tab extension extending from one side of the collar that attaches to the at least one web with fasteners, and a tubular element

that extends through the opening in the at least one collar for connecting a plurality of panels together.

31. The modular construction system of claim 30, wherein the first joinery assembly further includes joint closures for covering the space between the struts and bracing elements for securing the panels in place.

32. The modular construction system of claim 29, further comprising a second joinery assembly that includes at least one bracket attached to the struts of at least two panels, the at least one bracket having an opening extending therethrough, and a tubular element that extends through the opening in the at least one bracket for connecting a plurality of panels together.

33. The modular construction system of claim 32, wherein the second joinery assembly further includes joint closures for covering the space between the struts and bracing elements for securing the panels in place.